Entergy Arkansas, LLC

2021 Integrated Resource Plan

Stakeholder Q&A

SEPTEMBER 24, 2020

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Q&A Response Disclaimer

Entergy Arkansas's responses to questions received are set forth within this document. Some of those questions include statements of fact or assumptions within the submittal, which EAL may not agree are accurate factually. EAL's intent with these responses is to provide relevant information as it is able and not to address the factual assertions or premises included therein. Accordingly, any such failure to address such statements should not be viewed as acceptance by EAL of the premise asserted in the question.

Question 1

- Do you have estimates on when these projects will be completed, and when we can expect to see them come through on EAL's Attachment O?

A. *The following link provides Transmission Projects and their projected in-service date. Projects are applied to Entergy Arkansas's Attachment O after they are completed.*

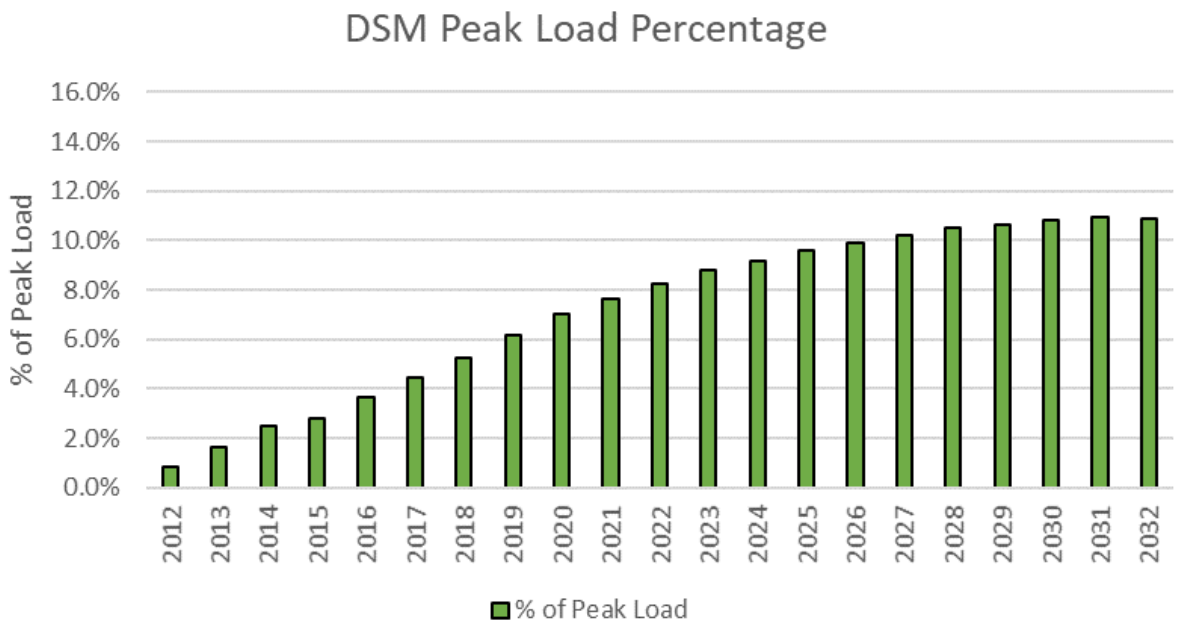
https://www.oasis.oati.com/EES/EESdocs/Construction_Plan.htm

Question 2

- Does the Company have any graphic or tabular representation of the historic and planned RELATIVE contribution of DSM programs - percent/share of load reduced, program size compared to new generation and to load requirements, etc.?

A. *Refer to the included chart, which will be updated as part of the 2021 data posting. These values reflect utility-sponsored DSM programs. Additional information on Entergy Arkansas's DSM programs can be found in APSC Docket No. 07-085-TF.*

For a detailed narrative on how Entergy Arkansas accounts for its DSM programs in its sales and load forecasts, please refer to page 29 of the 2018 IRP.



Question 3

- Can the Company also provide any information about its objectives/goals, metrics, and performance against social equity, energy justice, and/or climate justice criteria relating to sustainability?

A. *For a discussion of these issues, including how Entergy Arkansas addresses poverty, quality education, affordable and clean energy and peace, justice and strong institutions, refer to the social section of Entergy's 2019 Integrated Report. Additionally, Entergy Arkansas publishes a Human Rights Statement.*

Question 4

- Does the Company track its performance against the RCP 8.5 scenario? Isn't actual weather tending to match RCP 8.5 pathways?

A. *Researchers have published a number of studies in recent years that model long-term decarbonization pathways for the U.S. or globally. Entergy Arkansas relies on forecasts developed by the International Energy Agency to help guide the Company's scenarios that explore a two-degree pathway, specifically the Sustainable Development Scenario published as part of the World Energy Outlook. The SDS is intended to achieve the objectives of the Paris Agreement on climate change (i.e., limiting warming to well below two degrees), while also meeting goals for air quality and universal access to energy.*

While the IEA scenarios are helpful in this process, they are not the only credible scenarios published. Recent work by the Electric Power Research Institute ("EPRI") has noted that over 400 scenarios for limiting warming to two degrees Celsius have been produced in recent years. This research indicates that a broad range of emissions pathways could be consistent with meeting a two-degree temperature increase limitation. The variety of two-degree scenarios identified by EPRI demonstrates some of the uncertainties in the climate system, economic development, energy use, technology, policy timing and economic system dynamics.

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Question 4 (continued)

- Does the Company track its performance against the RCP 8.5 scenario? Isn't actual weather tending to match RCP 8.5 pathways?

A. *As the EPRI research indicates, there are challenges in translating global emissions pathways to the actions of a nation, region or sector and even more to the actions of an individual utility company. EPRI notes: "At the highest level, there is uncertainty in the relationship between a global temperature goal and global greenhouse gas emissions. From there, the uncertainty only increases as we move from global to country to local emissions with additional factors entering the story at each level." For example, a company may increase its generation and emissions, but displace higher-emitting generating units within a power market. As a result, assuming emissions reduction targets across all sectors or even for all electric utilities, for example, may not be appropriate in all cases. For the purposes of Entergy Arkansas's climate analysis, the Company focused on the carbon rate of the electric sector in the IEA projections but also took into consideration the role of electric generation within Entergy Arkansas's utility service area.*

EPRI Study Citation - Rose, SK, M Scott, 2018. Grounding Decisions: A Scientific Foundation for Companies Considering Global Climate Scenarios and Greenhouse Gas Goals. EPRI, Palo Alto, CA. 3002014510.

Question 5

- Does the Company have data on CO_2-e per customer? Per $ of revenue requirement? Will the Company share the MJ Bradley study? Will the Company share its plans and commitments out to 2050 for carbon reductions?

A. *Entergy Arkansas's key climate performance indicator is lbs. of CO_2 per MWh because it is focused on production of the Company's primary product, electricity. The data necessary to calculate the other metrics listed are all contained in Entergy Arkansas's 2019 Statistical Report and Investor Guide, an annual compilation of various data sets related to company operations and financial performance (see revenues and utility customer count on page 35 and plant-specific CO_2 emissions on pages 38, 40, 42, 44 and 46).*

Entergy Arkansas helps sponsor this annual study by MJ Bradley & Associates, which is made available to the public. See https://www.mjbradley.com/content/emissions-benchmarking-maps.

In our 2019 climate report, Entergy Arkansas examines scenarios out to 2030 and then discusses the future beyond 2030 on pages 42 to 44. Entergy Arkansas evaluates longer-term scenarios in the integrated resource planning process (typically 20 years).

Question 6

- Will the IRP explain how new CO_2-emitting resources added after today will be paid for if carbon emissions must be eliminated over a period less than the remaining useful life of those plants? How will potential stranded costs be evaluated in the IRP?

A. *No, that is not within the scope of the IRP. A futures-based approach will be used to evaluate portfolio plans over a range of possible outcomes. CO_2 regulation will be one of the assumptions that will be varied over a range of possible outcomes.*

With respect to stranded costs, refer to the above response.

Question 7

- What assets does EAL plan to utilize in serving the Memphis Light, Gas and Water (“MLGW”) load?

A. *Entergy Arkansas has no plans to serve MLGW’s load.*

Question 8

- What is current EAL fleet average emissions factor? What would it be without ANO?

A. *Entergy Arkansas's 2019 equity share CO_2 emissions rate, which includes the company's contractual share of generation from Grand Gulf, was 622 lbs/MWh. While it would be reasonable to assume the CO_2 emissions rate would be higher if ANO was not part of EAL's portfolio, it is impractical to estimate a figure because those MWh would be need to be replaced by other generation in order to serve its customers' energy needs and the CO_2 emissions rate of that hypothetical generation is unknown.*

Question 9

- What source does Entergy use for RE costs going forward? Is any market intelligence used?

A. *Entergy Arkansas relies on third-party industry consultants to provide the Company with unbiased, updated indicative renewable pricing for its modeling and validate the pricing with actual projects in the market.*

With respect to market intelligence, refer to the response above.

Question 10

- Entergy NOLA may well be on track to eliminate carbon emissions under an RPS that the Council there is developing. Does Entergy Arkansas plan to count those emission reductions against its performance as part of the "fleet" or "operating companies" reporting?

A. *Entergy Corporation's 2030 climate goal is focused on the utilities as a whole – some operating companies' emission rates may be higher, while others may be lower.*

Question 11

- Please provide comparative data of the annual and cumulative changes in energy and peak demand vs. resource additions over the planning period. (Assume this will be part of the IRP.)

A. *Slide 41 of the Stakeholder Materials reflects Entergy Arkansas's current Load and Capability position, including peak demand plus reserve margin. Assumptions for potential resource additions over the planning period will not be determined until modeling takes place later in 2021. Annual and cumulative changes in energy and peak demand and resource additions will be part of the IRP Report.*

Question 12

- What is the anticipated decommissioning timeframe for Arkansas Nuclear One (ANO)?

A. *ANO-1 and ANO-2 have operating licenses that currently extend until mid-2034 and mid-2038, respectively. As with all generating units in Entergy Arkansas's portfolio, detailed assessments are performed to determine the economic end of useful life, and timelines for decommissioning will be established as retirement decisions for ANO are imminent.*

Question 13

- Can Entergy please include wind power and transmission in its modeling of resource additions? EAL is sitting just east of some of the best wind resources in the world.

A. *With wind, several significant factors can impact price (location, transmission interconnection costs, land cost, etc.). These project-specific factors will be taken into consideration at the time of execution; however, for purposes of the IRP, supply-side alternatives are intended to be modeled as generic and not site-specific. The planning within the IRP construct is more strategic in nature that provides some guidance of possible resource options for future needs. Once a specific need is determined, the tactical evaluations will take into account transmission (and even distribution) impacts on the viability of the sources under review.*

Question 14

- How will the recent ruling of MISO's treatment of LMRs in FERC Docket ER20-1846 affect LMRs served by EAL?

A. *Entergy Arkansas has been an active stakeholder in MISO's Resource Availability and Need ("RAN") Initiative, which includes updated capacity accreditation requirements for Load Modifying Resources ("LMRs").*

For a more detailed narrative regarding potential impact to Entergy Arkansas's LMRs, refer to Pages 8-11 of the '2020 Annual Report of the Participation in MISO's Planning Resource Auction' located at the following link:

http://www.apscservices.info/pdf/10/10-011-U_1144_1.pdf

Question 15

- What models does the Company use? How do these models integrate evaluation of distributed resources--what is the minimum size considered? Are VREs evaluated as resources in the capacity expansion model? Are distribution or transmission infrastructure requirements evaluated at the same time that the models "select" resources to serve load? Will the Company share base assumptions on costs and other characteristics for all forms of generation, storage, DSM, T&D infrastructure?

A. *AURORA will be used to perform capacity expansion to determine the market build assumptions for each future scenario and to develop optimized portfolios for Entergy Arkansas for each future scenario. AURORA will also be used to perform production costing to assess the variable supply cost effects of the portfolios developed for Entergy Arkansas.*

The effects of distributed resources will be included in the hourly load forecast. There is no minimum size limitation.

Assuming this is referring to voluntary renewable energy markets, the resource planning objectives seek to serve Entergy Arkansas's customers reliably and at the lowest reasonable cost while considering risk. The resources considered to meet Entergy Arkansas's needs will include renewable alternatives on both the supply-side and the demand-side. How rates and programs are structured, however, are not contemplated as part of the IRP but rather at the time of implementation.

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Question 15 (continued)

- What models does the Company use? How do these models integrate evaluation of distributed resources--what is the minimum size considered? Are VREs evaluated as resources in the capacity expansion model? Are distribution or transmission infrastructure requirements evaluated at the same time that the models "select" resources to serve load? Will the Company share base assumptions on costs and other characteristics for all forms of generation, storage, DSM, T&D infrastructure?

A. *Detailed transmission data is not a direct input in the modeling or a primary driver of the type of resource selections in long-range planning. The planning within the IRP construct is more strategic in nature that provides some guidance of possible resource options for future needs. Once a specific need is determined, the tactical evaluations will take into account transmission and distribution impacts on the viability of the sources under review.*

Consistent with the 2018 IRP, EAL will provide cost and performance assumptions for the forms of generation included in the analysis.

Question 16

- RE: Slide 41, Could EAL provide the same projections but in MWh/yr, along with capacity factors of the various generation technologies in the projected portfolio?

A. *The portfolios have not been developed at this time; therefore, the requested data has not been produced. Once portfolios have been developed, production costing simulations will be performed to assess the variable supply cost effects, including projected energy production and capacity factors.*

Question 17

- How will the Company account for the costs of carbon--in terms of both compliance costs and social costs?

A. *As part of Entergy Arkansas's planning process, it models a range of carbon price forecasts, what the Company calls the CO_2 Point-of-View ("POV"). Updated at least annually, the Entergy Arkansas CO_2 POV reference scenario includes the assumptions regarding the costs of a national policy to reduce carbon emissions. This POV is based on a range of potential policies and timing dependent on federal and major state policy actions, as well as potential longer-term trends and policies to limit CO_2 emissions. The impact of these policies on the power sector is modeled using ICF's Integrated Planning Model platform, including the development of a CO_2 allowance price ($ per ton). The POV includes a probability-weighted curve based on the likely implementation of a carbon fee and a high-, medium- and low-impact carbon policies on a national level. Currently, the high case is similar to emissions reductions and the process included in the federal cap-and-trade program under the Waxman-Markey bill that passed the U.S. House of Representatives in 2009. The mid case is based on the United States Environmental Protection Agency's 2015 Clean Power Plan, and the low case is based on a program similar to the current Affordable Clean Energy Rule proposal that would require emission control standards and potential capital expenditures, but that would not place an actual price on carbon emissions. Under a cap-and-trade or a carbon tax/fee policy approach, the allowance price reflects the marginal cost of compliance. Such a policy could be implemented by paying a tax or purchasing a credit or by switching to less carbon-intensive fuels, shifting dispatch toward more efficient resources, or building less carbon-intensive generation sources such as renewables or new/expanded nuclear generation. The individual case model outputs are then probability weighted, according to ICF's professional judgement, based on the likelihood of the various outcomes. The most up-to-date POV carbon price forecast will be used in the integrated planning process.*

Question 18

- Given the just-stated aversion to generation resources located outside of AR and the ongoing operational challenges of Grand Gulf, will EAL be modeling a replacement of the Grand Gulf capacity with a generation asset located in AR?

A. *With the recent updates and modernization at Grand Gulf, there has been a significant improvement in the facilities' operation. The capacity factor for the facility for all of 2019 was 92%. That result is anticipated to continue after the recent refueling and additional facility upgrade (turbine control system).*

Question 19

- Will the Company consider including at least one scenario in the IRP that relies on non-utility resources procured through an all-sources RFP, including DSM, storage, DG, and IPPs?

A. *Refer to the response to question 15. AURORA will be used to perform capacity expansion to develop optimized portfolios for Entergy Arkansas and incremental resource additions eligible to be selected to those portfolios will include many resource types.*

Question 20

- Isn't it true that Aurora does not co-optimize transmission or distribution costs, does not evaluate small scale storage, and does not evaluate VRE below 50 MW increments?

A. *Refer to the response to question 15. Storage will be included as a potential resource alternative, and the size will be consistent with Entergy Arkansas's needs and economies of scale.*

Question 21

- Does the Company rely on weather forecasts? Or does it rely on historical weather? If historical, how does it account for climate change? What historical period is used to forecast extreme weather? How does climate change impact the normalization process?

A. *The Company uses historical weather data in the development of the load forecasts used for long-term planning such as the IRP forecasts. Specifically, forecasts of billing-month electricity volumes are based on a 20-year average of historical temperatures by month to smooth out anomalies caused by extreme weather events. This 20-year average is commonly referred to as "Normal Weather" or "20-year Normal Weather," though the period used by other utilities could be shorter or longer. The monthly energy is parsed into hourly energy using 20 years of daily weather to develop "normal" load shapes to apply to the forecasts of monthly energy.*

The calculated levels of "normal" monthly weather described above are used for the first year of the forecast. Normal temperature levels for subsequent years are trended higher or lower by month based on trends in the 20-year rolling averages of observed monthly temperatures. This process is referred to as "Trended Normal Weather." The levels of trended normal weather are updated each year to allow for changes in the trends.

As mentioned above, the forecasts are based on trended normal weather. The forecasts are not based on extreme weather.

Question 22

- To what extent do the Company forecasts reflect recent proposed changes in national efficiency standards?

A. *For the most recent forecast, the Company is using estimates of end-use consumption that are developed by Itron and are based on the 2020 Annual Energy Outlook from the Energy Information Administration ("EIA"). That data from EIA does not incorporate proposed changes, only known laws and standards.*

Question 23

- Do you place a value on a long-lived facility such as nuclear that may reasonably function for 60-80 years? A 20-year planning horizon that doesn't value long-lived plant may not result in lowest cumulative cost to ratepayers over a longer time frame.

A. *For purposes of the IRP, it is not practical to perform evaluations for the entire assumed life of new resource additions because of the uncertainty associated with extending the assumptions that are needed to perform these evaluations for greater periods of time. However, the fixed cost revenue requirements of new resource additions are expressed in terms of levelized real costs that are representative of the cost associated with a resource for a period of time less than its assumed useful life.*

Question 24

- What objectives are being used to construct the "manual" portfolios?

A. *Whether manual portfolios will be evaluated, and the specific objectives used to develop those manual portfolios, have not yet been determined.*

Question 25

- What does "incremental fixed costs" include? Is this another way of saying "lost revenues?" Or something else?

A. *The “incremental fixed costs” term refers to the fixed cost components of the incremental resources added via AURORA optimization or manual portfolios.*

Question 26

- Do your portfolio carbon intensity figures, expressed in pounds CO_2/MWh, include life cycle emissions, or are they strictly operational emissions? Also, since we are concerned about climate forcing effects, carbon intensity should be expressed as grams CO_2-equivalent/kWh. This would align with global standards, and importantly, would take into account climate effects of non-CO_2 greenhouse gases. For methane, for example, this is quite significant as fugitive emissions of methane from production and transmission can place gas nearly as impactful as coal in terms of climate effects.

A. *Entergy Arkansas's comprehensive greenhouse gas inventory (links provided below) accounts for some supply chain emissions and for the other greenhouse gases such as methane (CH4), nitrous oxide (N2O), and hydrofluorocarbons (HFCs). Full life cycle emissions of the production of the materials and fuels the Company uses, however, are not included. Entergy Arkansas is engaged with fuel and material suppliers on emission and sustainability issues through both the Electric Utility Industry Sustainable Supply Chain Alliance and the Natural Gas Supply Collaborative.*

2019 Entergy Arkansas GHG Documentation

2019 GHG Inventory
2019 Inventory Management Plan and Reporting Document
2019 GHG Inventory Third-Party Verification Statement and Report

Question 27

- Does this time schedule mean that the DSM potential study will be completed in time for the Data Posting?

A. *Yes, the current schedule reflects delivery of the completed DSM potential study to Entergy Arkansas prior to the Stakeholder Data Posting.*

Question 28

- When evaluating estimated costs of future generation options, to what extent is reliability (e.g., capacity factor) taken into consideration? Is there a way to incorporate reliability into LEC calculations?

A. *When performing capacity expansion with AURORA to develop optimized portfolios for Entergy Arkansas, the projected fixed and variable costs of resource alternatives are taken into consideration, which include assumptions around planned maintenance and unplanned maintenance.*

The levelized cost of electricity calculations are based on assumed capacity factors that include consideration of the planned and unplanned maintenance requirements of new resource alternatives when appropriate.

Question 29

- Will risk assessment include economic impacts of cost of energy on low income communities, given that cost is likely to rise and there may be more control of costs if communities controlled their own energy with community solar? That is, will there be comparisons of cost of energy for communities should they control their own solar energy production?

A. *Details of the risk assessment are still being developed, and your suggestion will be taken into consideration.*

Question 30

- I am concerned about the projected increasing reliance on solar and gas. 1) At scale, solar locks in combined cycle and single cycle gas for load balancing; 2) locking in gas at this scale makes it difficult to stay on a glide slope to zero emissions by 2050, possibly resulting in gas stranded assets; 3) batteries may come down in price, but they will still be unlikely to be available at multi-day to seasonal levels of storage.

A. *Results of the IRP are not intended as static plans or pre-determined schedules for resource additions and deactivations. The Entergy Arkansas IRP is updated every three years and will take into account the latest assumptions, such as updated market outlooks and technologies.*

Question 31

- Explain differences between MISO and EAL transmission planning methodology and why it is causing projects to be withdrawn and deferred. Explain how your chart shows MTEP 21 projects when MTEP 21 is not yet completed. Will the IRP modeling overlay the transmission constraints, or will it be treated like a copper sheet?

A. *MISO and Entergy Arkansas Transmission Planning methodology differences do not cause projects to be withdrawn or deferred. Projects are withdrawn or deferred when both MISO and Entergy Arkansas determine a NERC TPL need is no longer valid for Baseline Reliability Projects. Transmission projects classified as Other can be removed or withdrawn at the Transmission Owner's request based on the planning need, pending MISO approval.*

As answered verbally during the meeting, MTEP 21 projects are developed by the Transmission Owners and submitted to MISO the year prior to MISO starting the same MTEP cycle. For example, MTEP 21 projects are created in 2020, submitted by the September 15th MISO deadline in 2020, then discussed in future Subregional Planning Meetings until approval by MISO Board of Directors in December of 2021. This is the normal process all Transmission Owners follow for reliability projects.

Detailed transmission data is not a direct input in the modeling or a primary driver of the type of resource selections in long-range planning. The planning within the IRP construct is more strategic in nature that provides some guidance of possible resource options for future needs. Once a specific need is determined, the tactical evaluations will account for transmission and distribution impacts on the viability of the sources under review.